

MSEL Cross-cutting Interactions

Leslie E. Smith, Director

Materials Science & Engineering Laboratory

VCAT Presentation

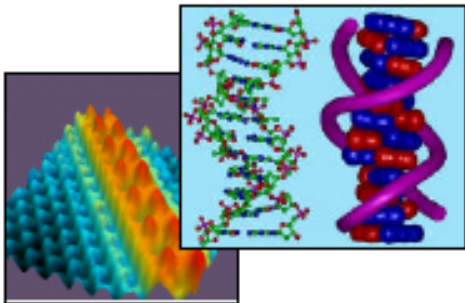
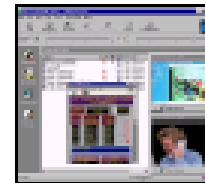
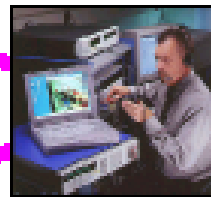
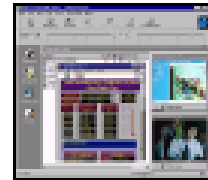
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Types of Cross-cuts

- Inter-disciplinary
- Inter-organizational
 - Inter-OU
 - Inter-division

Importance of Cross-cutting Work

Science and technology are becoming increasingly interdisciplinary



Customer needs are becoming increasingly multidisciplinary

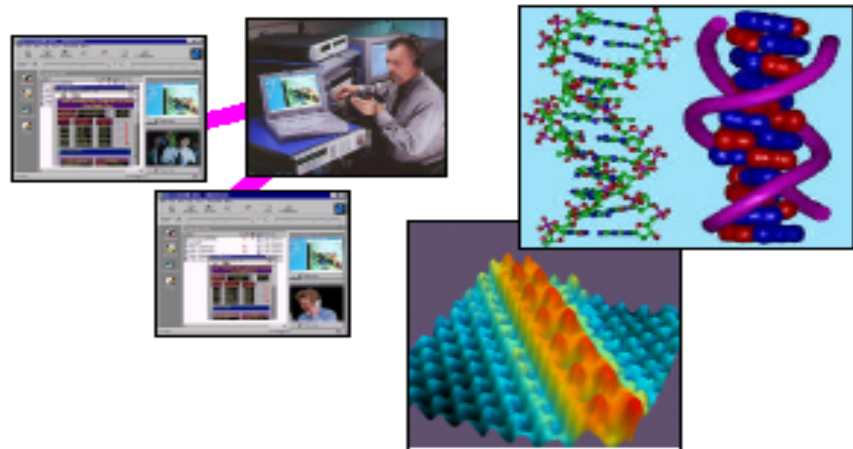
Our customers deserve the best
NIST can offer regardless of
organizational boundaries



Changing Customer Needs

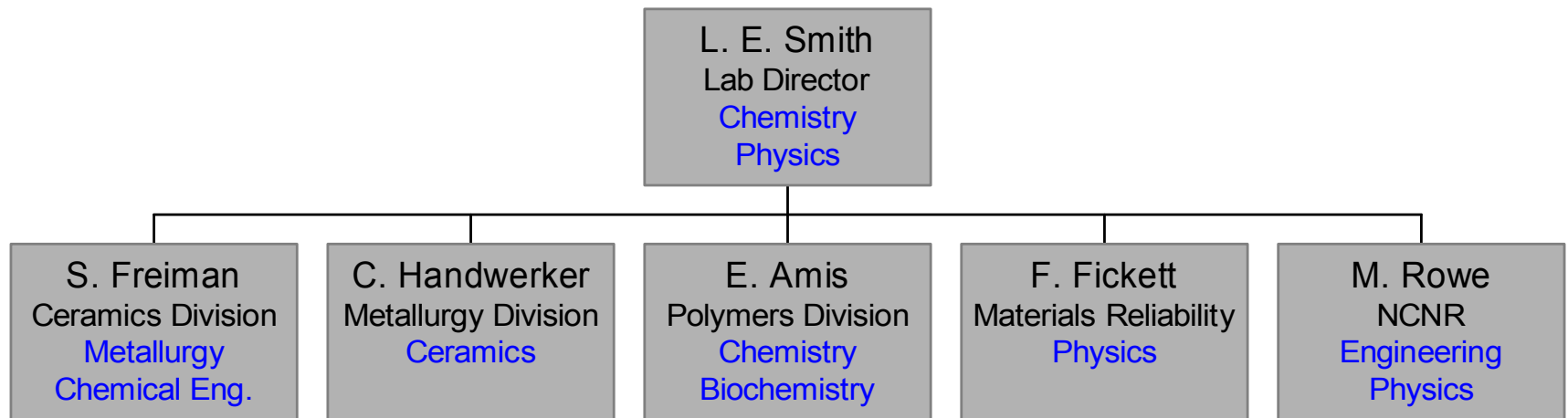
Technology and industry becoming increasingly multidisciplinary

- Information technology - affecting all S&T
- Nanotechnology - growing emphasis in S&T
- Biotechnology - changing chemistry and materials
- Materials – affected by all above



Materials Are Interdisciplinary

Materials Science & Engineering Laboratory



Minimizing Discipline Barriers

- Introduce the vocabulary of other fields
- Have frequent encounters with other disciplines
- Create a stimulating environment where change is common
- Arrange proximity to mix scientists with different backgrounds
- Focus on capability rather than training

Facilitating Multidisciplinary R&D at NIST

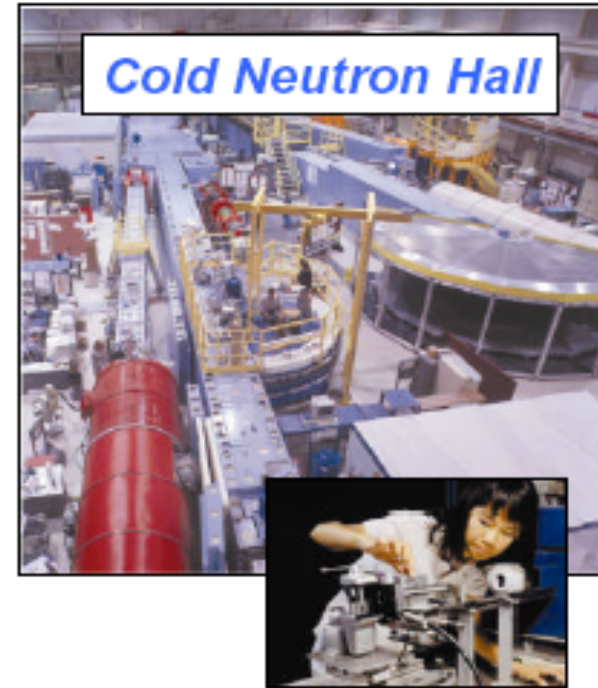
Both “top down” and “bottom up” approaches are used:

- Mediated through NIST director’s decisions
 - Strategic planning
 - NIST centers and offices
 - Competence funding and budget requests
- Mediated through OU management decisions
 - OU directors reserve
 - Reprogramming
- Driven by ideas of bench level scientists and engineers

Facilitating Multidisciplinary Metrology

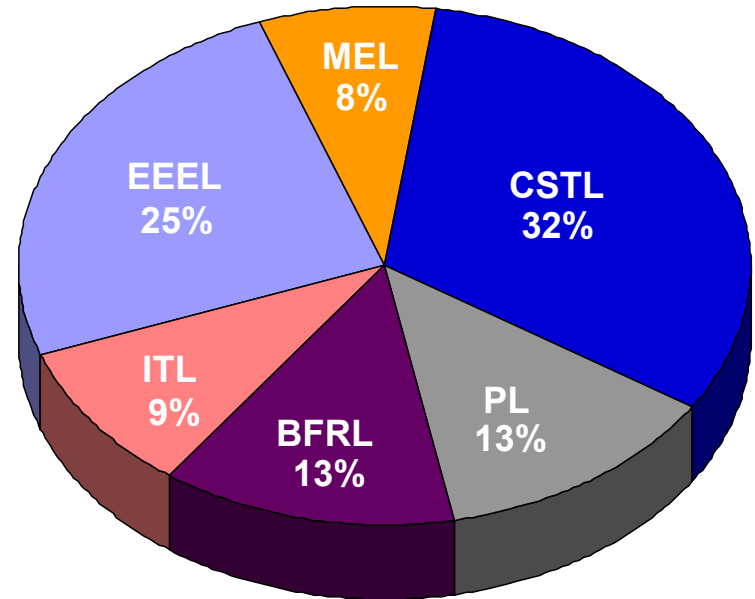
NIST centers and offices

- **NIST center for neutron research**
 - MSEL, CSTL, PL, others
- **Office of microelectronics programs**
 - EEEL and six other MSL OUs
- **National advanced manufacturing Testbed**
 - MEL and all MSL OUs
- **SIMNet**
 - MEL, EEEL, others
- **Office of law enforcement standards**
 - EEEL and five other OUs



MSEL - Crossing Organizational Lines

- 55 researchers in 120 OU to OU collaborations
- 26% of technical staff
- 75% do not exchange funds
- \$3 M transferred to MSEL
 - \$1.7 M to CNRF



Examples of Cross-OU Work

- Metrology for Tissue Engineering
 - Recent joint Competence award with CSTL is foundation of challenging new area of work
- Wide Band Gap Semiconductors
 - Joint proposal with EEEL for Competence funding led to commitment without new funds

Nanomagnetodynamics

- MSEL coordinated unified description of NIST work in magnetics
- EEEL formed new Division on magnetic technology
- MSEL Division Chief managed EEEL Division during search for permanent head
- Joint work led to joint EEEL/MSEL program in nanotechnology with extramural component

Combinatorial Methods

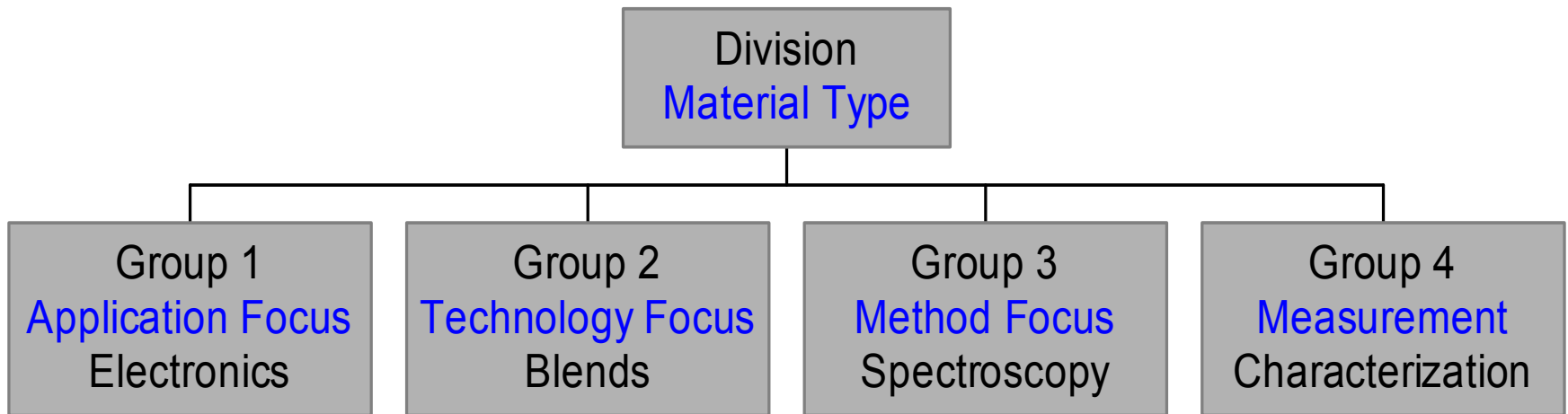
- Working Group of scientists and engineers from all Labs began to explore common interests
 - Enhance awareness of NIST-wide combinatorial methods R&D and interest
 - Foster multi-OU collaboration and team building
- ATP played a significant role in focusing attention on topic
- Competence with CSTL funded
- Industrial consortium formed in January to act as single point of entry to NIST work



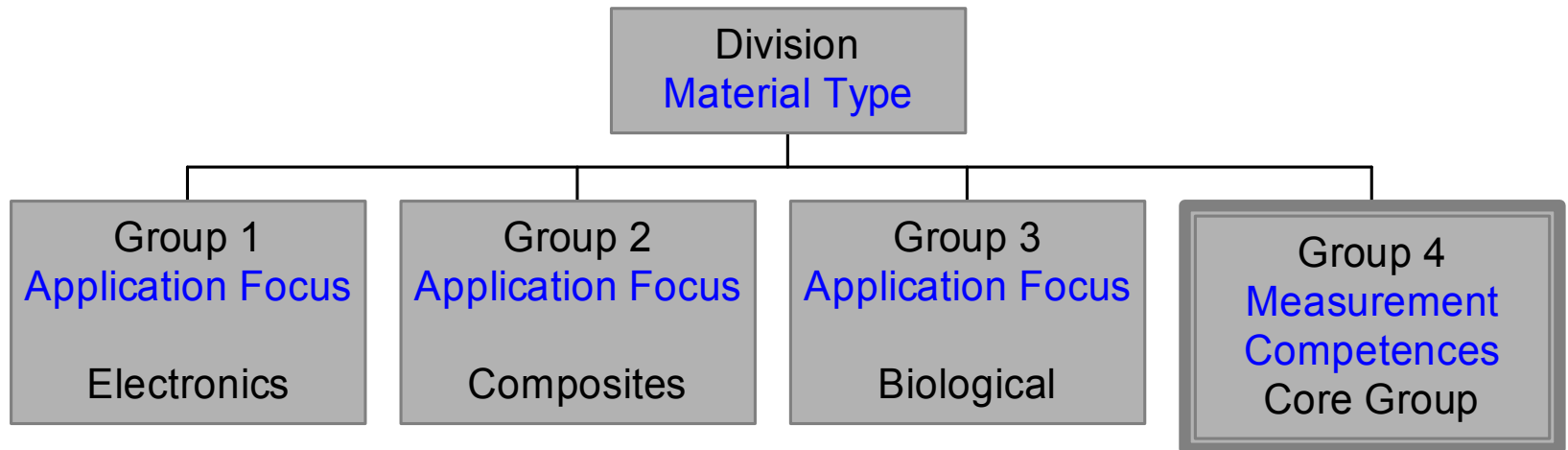
Minimizing Organizational Barriers

- Frequent, meaningful communication
- Experience in other organizations
- Willingness to compromise local priorities
- Rewards for contributions to team efforts
- Focus on outcomes and impact

Traditional MSEL Division



Team-based Division



Team-based Division

- Application focus has identified customers and stakeholders
- Most resources allocated to targeted teams
- 50% of division in core group; Most are members of targeted teams
- Staff move to application group when their time commitment becomes very large
 - About 20 % change groups each year
- Results to date:
 - Change viewed with some anxiety but now morale seems high
 - Number of projects reduced; More focus
 - Burst of surprises when large group challenged to think across borders
 - Productivity is up by most measures

Fostering Interdisciplinary Work

- Value capability, not training
- Create stimulating creative environment
- Focus on outcomes
- Encourage teamwork, reward group efforts
- Always look for different approaches